



# DECUS

## PROGRAM LIBRARY

DECUS NO.	8-283
TITLE	A.V.S.C. (ANALYSIS OF VARIANCE, SINGLE CLASSIFICATION)
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SOURCE LANGUAGE	FORTRAN D

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# A.V.S.C. (ANALYSIS OF VARIANCE, SINGLE CLASSIFICATION)

DECUS Program Library Write-up

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## Summary

This program computes the means, between-groups sum of squares and mean square, and within-groups sum of squares, mean square, and standard error for univariate data. Versions of the program are available for carrying out transformations on the data on input, i. e. :

angular transformation       $(\arcsin \sqrt{x})$

square root transformation     $(\sqrt{x + 0.5})$

logarithmic transformation    $[\log_{10} (x + 1)]$

## Tapes Required

Form of program tape - The program is written in the PDP-8 FORTRAN-D language, and is in the source language.

Form of data tape - The data to be analysed should be punched on to paper tape in the ASCII code. The data should begin with the number of groups, followed by the number of values in the first group and the values of this group, the number of values in the second group, e.g.:

```
4
5
40 24 46 20 35
5
29 27 20 39 45
5
11 31 17 37 39
5
17 21 28 33 21
```

## Operating Instructions

```
.FORT
*OUT-S:AVSC
*
*IN-R:
*↑
↑
*READY
↑
```



If the program has already been compiled on to the disk the program may be called back into core as follows:

```
.FOSL
*IN-S:AVSC
*
*OPT-
*↑
*READY
↑
```

### Output

The program prints the mean for each group, together with the within-groups degrees of freedom sum of squares, and mean square, and the standard error of the group means. These are followed by the mean of all groups, the between-groups degrees of freedom, sum of squares, mean square and F-ratio. The results for the example of Form of data tape are given below in the form in which they are printed.

0.330000E+2				
0.320000E+2				
0.270000E+2				
0.240000E+2	16	0.164800E+4	0.103000E+3	0.453872E+1
0.290000E+2	3	0.270000E+3	0.900000E+2	0.873786E+0

### Storage and Limitations

Normal for FORTRAN-D. The maximum number of individuals in a single group has been set at 100, but there is no restriction on the number of groups.

### Method

The method of analysis follows closely the conventional method of calculating the analysis of variance for a single classification.

# AVSC LOG TRANSFORMATION DATA FROM H.S.R.

```

L
C      ANALYSIS OF VARIANCE, AVSC
1      DIMENSION V(100)
100    V0=V1=V2=V3=V8=V9=0.0
      READ 2,100,N2
      FORMAT (I)
      DO 9 I=1,N2
      READ 2,100,N3
      V10=N3
      DO 20 J=1,N3
      READ 2,101,V(J)
      V(J)=LOGF(V(J)+1.0)*0.434294
      CONTINUE
      FORMAT (E,E,E,E,E)
      V4=V5=0.0
      DO 60 N4=1,N3
      V4=V4+V(N4)
      V5=V5+(V(N4)*V(N4))
      CONTINUE
      V2=V2+V4
      V3=V3+V5
      V6=V4/V10
      TYPE 102, V6
      FORMAT (/,E)
      V1=V1+V10
      V4=V4*V4/V10
      V0=V0+V4
      V5=V5-V4
      V9=V9+V5
      CONTINUE
      N5=V1
      V5=N5-N2
      V6=N5
      V7=V9/V6
      V4=N2
      V6=SQTF(V7/(V1/V4))
      TYPE 103,N5,V9,V7,V6
      FORMAT (I,E,E,E)
      V3=V2/V1
      V2=N2-1
      V0=V0-(V2*V2/V1)
      V4=N2
      V2=V0/V4
      V3=V2/V7

```

```

TYPE 104,V8,N2,V0,V2,V3
FORMAT (/,E,I,E,E,E/,/,/,/,/)
GO TO 1

```



AVSC NO TRANSFORMATION  
DATA H.S.R.

```

L
C ANALYSIS OF VARIANCE, AVSC
  DIMENSION V(100)
  V0=V1=V2=V3=V8=V9=0.0
  1 READ 2,100,V2
  100 FORMAT (1)
    DO 9 I=1,V2
      READ 2,100,V3
      V10=V3
      DO 20 J=1,V3
        READ 2,101,V(J)
        20 CONTINUE
      101 FORMAT (E,E,E,E,E)
        V4=V5=0.0
        DO 60 V4=1,V3
          V4=V4+V(N4)
          V5=V5+(V(N4)*V(N4))
          60 CONTINUE
        V2=V2+V4
        V3=V3+V5
        V6=V4/V10
        TYPE 102, V6
        102 FORMAT (/ , E)
          V1=V1+V10
          V4=V4*V4/V10
          V0=V0+V4
          V5=V5-V4
          V9=V9+V5
          9 CONTINUE
          V5=V1
          V5=V5-V2
          V6=V5
          V7=V9/V6
          V4=V2
          V6=SQRT(V7/(V1/V4))
          TYPE 103,V5,V9,V7,V6
          103 FORMAT (I, E, E, E)
            V3=V2/V1
            V2=V2-1
            V0=V0-(V2*V2/V1)
            V4=V2
            V2=V0/V4
            V3=V2/V7
            TYPE 104,V3,V2,V0,V2,V3
            104 FORMAT (/ , / , E, I, E, E, E, / , / , / , / , / )
              GO TO 1
            END

```

\*